

REMARKS/ARGUMENTS

The present communication is responsive to the Official Action mailed January 31, 2003. A petition for a three-month extension of the term for response to said Official Action, to and including July 31, 2003, is transmitted herewith. As said Official Action was a final Official Action, applicant's request for continued examination is also transmitted herewith. Moreover, a Supplemental Information Disclosure Statement is also submitted herewith.

Claims 4 and 5 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by *Lakritz et al.*, U.S. Patent 4,545,610. This rejection is not understood. As previously pointed out (text extending from p. 4-5 of the remarks filed on or about November 7, 2002), *Lakritz* does not include the "columnar inclusions in solder masses" as referred to in claim 4. As recited in the claim and as illustrated in the particular example shown in the specification, the inclusions are "dispersed" within the solder masses ("therein"). Stated another way, the inclusions are not the elongated solder masses themselves, but instead are elongated particles or phases within a solder mass. Examples of this feature are discussed at paragraph [0012] and [0044]-[0045] of the present specification and depicted, e.g., in Figs. 13 and 14 of the drawings. (See the columnar precipitates 341.) Nothing in *Lakritz* has been pointed out either in the original rejection or in the final rejection as meeting this feature set forth in paragraph (b) of claim 4. Thus, even in light of the final rejection, it is not clear what feature, if any, in *Lakritz* is relied upon as showing "inclusions" of any sort within solder masses, let alone elongated or "columnar" inclusions which are dispersed within a solder mass and which are "oriented preferentially" in a particular direction, as also recited in the same paragraph of

the claim. As a matter of law, a reference which omits a feature recited in the claim cannot support a § 102 rejection, and the rejection must be withdrawn.

New claim 8 has been added by the present amendment. This claim states that the columnar inclusions are formed as a precipitate from the solder as set forth, for example, at paragraph [0045] of the present specification. This claim distinguishes over *Lakritz* for the same reasons as claim 4.

Claim 1 was rejected under 35 U.S.C. § 103 on *Lakritz* in view of *DiStefano et al.*, U.S. Patent 5,455,390. It is respectfully submitted that the references cannot properly be combined in the manner suggested in the final Official Action. The point raised in the final Official Action that *Lakritz* and *DiStefano* "are both from the same field of endeavor" merely establishes that both references are taken from analogous art and, hence, may be considered in a determination under § 103. It does not establish that a person of ordinary skill in the art would seek to use features from one reference in the very different structure of another reference.

Both *DiStefano* and *Lakritz* deal with the same overall problem of mounting a chip on a circuit board. However, these two references use entirely different approaches. The preferred embodiments of *DiStefano* referred to in the abstract cited by the Examiner make a sub-assembly including a chip 92 (Fig. 7) having terminals 30 on a sheet 32 overlying the chip and spaced apart from the chip by a compliant layer 80 (Fig. 6) with wires or "flexible leads 57" extending between the terminals 30 and the chip itself, so that the terminals can move relative to the chip. See *Id.* cols. 11-12. The terminals 30 can be mounted on a substrate such as a circuit panel by solder bonding the terminals to a circuit panel. (Col. 12, lns. 11-15.) Because the flexible leads extending through the compliant layer onto

the top sheet itself are flexible, the terminals can move relative to the chip itself, so as to compensate for differences in thermal expansion between the chip and the substrate. (Col. 12, lns. 44-48.) By contrast, *Lakritz* relates to "flip-chip bonding" of the semiconductor device or chip to the substrate (col. 1, lns. 14-15), i.e., bonding the chip 20 directly to the substrate 10 (Fig. 1, step 8) using solder masses 38 "between the pads on the device and the substrate" (col. 4, lns. 28-33). The solder masses are "elongated" or hourglass-shaped so that the solder masses themselves are resistant to the stresses caused by thermal expansion and contraction. (See col. 2, lns. 28-33.) Stated another way, *Lakritz* teaches conventional flip-chip bonding, in which the chip is directly directed to the circuit board but forms the solder masses in an elongated or stretched, hourglass shape.

By the present amendment, claim 1 has been further clarified to state that the dielectric layer has an outer surface facing away from the microelectronic element, and that the terminals are exposed at the outer surface. Merely by way of example, in the embodiment of Figs. 5 and 6, terminals in the form of via liners 26 extend through the dielectric sheet 20' and, hence, are exposed at the surface facing away from the chip or microelectronic element 30', so that these terminals can be connected to a further circuit panel 60. Other arrangements of outwardly-facing terminals are discussed at, e.g., paragraph [0044] of the present specification. The alleged terminals or pads 12 of *Lakritz* (the element connected to the solder columns) are not exposed an outer surface of any dielectric element; nor is there is any suggestion in *Lakritz* or *DiStefano* to modify the mounting of these pads. Again, the pads of *Lakritz* are not terminals which serve to mount the assembly to another circuit

board, but instead the pads 12 of *Lakritz* are the pads of the circuit board itself.

Even in hindsight, it is not clear how or why one could modify the device of *Lakritz* "to include a flexible dielectric with terminals as disclosed by *DiStefano*" as alleged in the final official action. The "terminals" allegedly taught in *Lakritz* are elements of the substrate or circuit panel itself. Stated another way, they are not terminals incorporated in the microelectronic element, but instead they are the pads of a circuit board on to which a microelectronic element is mounted by the solder masses 38. Even in hindsight, it is not clear how one would use a "flexible dielectric with terminals as disclosed in *DiStefano*" in *Lakritz*' assembly, or where such a dielectric could be placed in the connection scheme contemplated by *Lakritz*. Because nothing in the art of record has been advanced as suggesting how one could combine the incompatible teachings of the references, the § 103 rejection of claim 1 should be withdrawn.

Claim 2 has been amended for conformity with claim 1, so as to avoid possible double recitation of the element recited in paragraph (c) of claim 1 as a "flexible dielectric layer," and formerly recited in claim 2 as a "dielectric packaging structure." Also, the "exterior surface" formerly recited in claim 2 has been deleted from claim 2 to avoid redundancy with amended claim 1. Claim 3 has also been modified for conformity with amended claim 1.

Claims 2 and 3 were rejected under 35 U.S.C. § 103 as allegedly unpatentable over *Lakritz* in view of *DiStefano*, apparently as applied to claim 1, further in view of *Hoffman et al.*, U.S. Patent 5,578,869. Nothing in *Hoffman* has been pointed out as remedying the fundamental deficiencies of the combination of *Lakritz* and *DiStefano* pointed out above in connection with

claim 1, and the reasons set forth in claim 1 are believed to be fully applicable with respect to claims 2 and 3. Additionally, it is not clear how any teaching allegedly found in Fig. 3 of *Hoffman* could be applied in the package of *Lakritz*, much less in a package made by combining the *Lakritz* and *DiStefano* teachings. Here again, the mere fact that *Lakritz* and *Hoffman* are in the "same field of endeavor" does not show one of ordinary skill how one could combine their respective teachings, much less suggest that such a combination would be desirable.

New claim 9 has been added by the present amendment. New claim 9 is specific to the arrangement in which the terminals "overlie said front surface of said chip." For example, in the embodiment of Figs. 5 and 6, the terminals or via liners 26 overlie the contact-bearing surface or front surface of chip 30'.

As it is believed that all of the objections and rejections set forth in the final Official Action have been full met by the foregoing amendments and remarks, favorable reconsideration is earnestly solicited.

If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that she telephone applicant's attorney at (908) 654-5000 in order to overcome any additional objections which she might have.

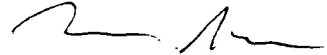
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If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

Dated: July 29, 2003

Respectfully submitted,

By 

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